# Gender Identity Change in a Transsexual

David H. Barlow, PhD; E. Joyce Reynolds, MS; W. Stewart Agras, MD, Jackson, Miss

**To our knowledge this case represents the first successful change of gender identity in a diagnosed transsexual. After initial attempts to change patterns of sexual arousal and suppress central transsexual fantasies failed, components of female role behavior in a 17-year-old male transsexual were defined, measured, and modified piece by piece.**

**Male and female components of sitting, standing, and walking were identified and changed from feminine to masculine. Next, masculine social behavior and vocal characteristics were instigated; following this, male sexual fantasies were initiated and strengthened. At this point attempts to change patterns of sexual arousal from homosexual to heterosexual, which had failed earlier, were successful. In many instances the procedures were experimentally demonstrated to be responsible for changes. These data indicate that gender role may not be as inflexible as assumed.**

Unlike effeminate homosexuals who occasionally request a sex change operation, transsexuals give a history of very early gender identity difficulties. Before the age of 5, and often as early as 2, these individuals engage in behavior appropriate to the opposite sex such that it is noticeable to their parents. Examples include spontaneous cross dressing, choice of play objects and activities appropriate to the opposite sex, and rejection of much appropriate sex role behavior. They may report being different from other children of the same sex; at a later age they make consistent and unequivocal requests for sex reassignment surgery.[1,2]

To date only this surgical procedure has offered any hope to the transsexual since the condition has been entirely refractory to psychologic intervention. When attempted, psychotherapy directed at changing transsexual attitudes and behavior has not worked.[3,4] Pauley[3] reports on 26 cases where reversal of psychosexual orientation through psychotherapy was attempted with no documented successes. Behavior therapy has not been any more successful; in the only reported series of cases to date using these techniques, Gelder and Marks[5] describe the treatment of five transsexual patients who were among a larger series of transvestites treated by shock for cross dressing in an aversion therapy paradigm. Although 18 of 20 transvestities were not cross dressing at follow-up, all five transsexuals continued to cross dress and request sex reassignment surgery.

The following case reports, to the best of our knowledge, the first successful attempt to change the gender identity of a diagnosed male transsexual. Components of the patient's female role behavior were defined, measured, and modified piece by piece. Where possible, an experimental analysis was performed to determine the effectiveness of the techniques used at each stage of treatment.

## Report of a Case

The 17-year-old male patient was the third boy and the last of five children. He was a keen disappointment to his mother since she desired a girl. Nevertheless he became her favorite child. His father worked long hours and had little contact with the boy.

For as long as the patient could remember he thought of himself as a girl. Spontaneous cross dressing, as reported by the patient and confirmed by his parents, began before the age of 5 years and continued into junior high school. During this period his mother reported that he developed an interest in cooking, knitting, crocheting, and embroidering, skills he acquired by reading an encyclopedia. His older brother often scorned him for his distaste of "masculine" activities such as hunting. The patient reported associating mostly with girls during this period, although he remembered being strongly attracted to a "boyfriend" in the first grade. In his sexual fantasies, which developed at about 12 years of age, he pictured himself as a woman having intercourse with a man. Although these fantasies were accompanied by masturbation, neither orgasm or ejaculation had occurred by the time of the initial interview.

His extremely effeminate behavior made him the object of scorn and ridicule when he entered high school at age 15. Usually passive and unassertive, he ran away from home at this time and attempted suicide by an overdose of antihistamines. A return to school resulted in fainting spells. He left school and was placed under the care of a psychiatrist who hospitalized him briefly and then maintained him on antidepressants and phenothiazines for nine months. Upon referral he was seen as moderately depressed, withdrawn, extremely frail (167.64 cm, 40.86 kg), and was attending secretarial school where he was the only boy in the class. A leukocyte chromosome analysis yielded a normal male pattern.

In summary, the following diagnostic signs were present: vali-

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From the Department of Psychiatry, University of Mississippi Medical Center, Jackson.

Reprint requests to Department of Psychiatry, University Medical Center, Jackson, MS 39216 (Dr. Barlow).

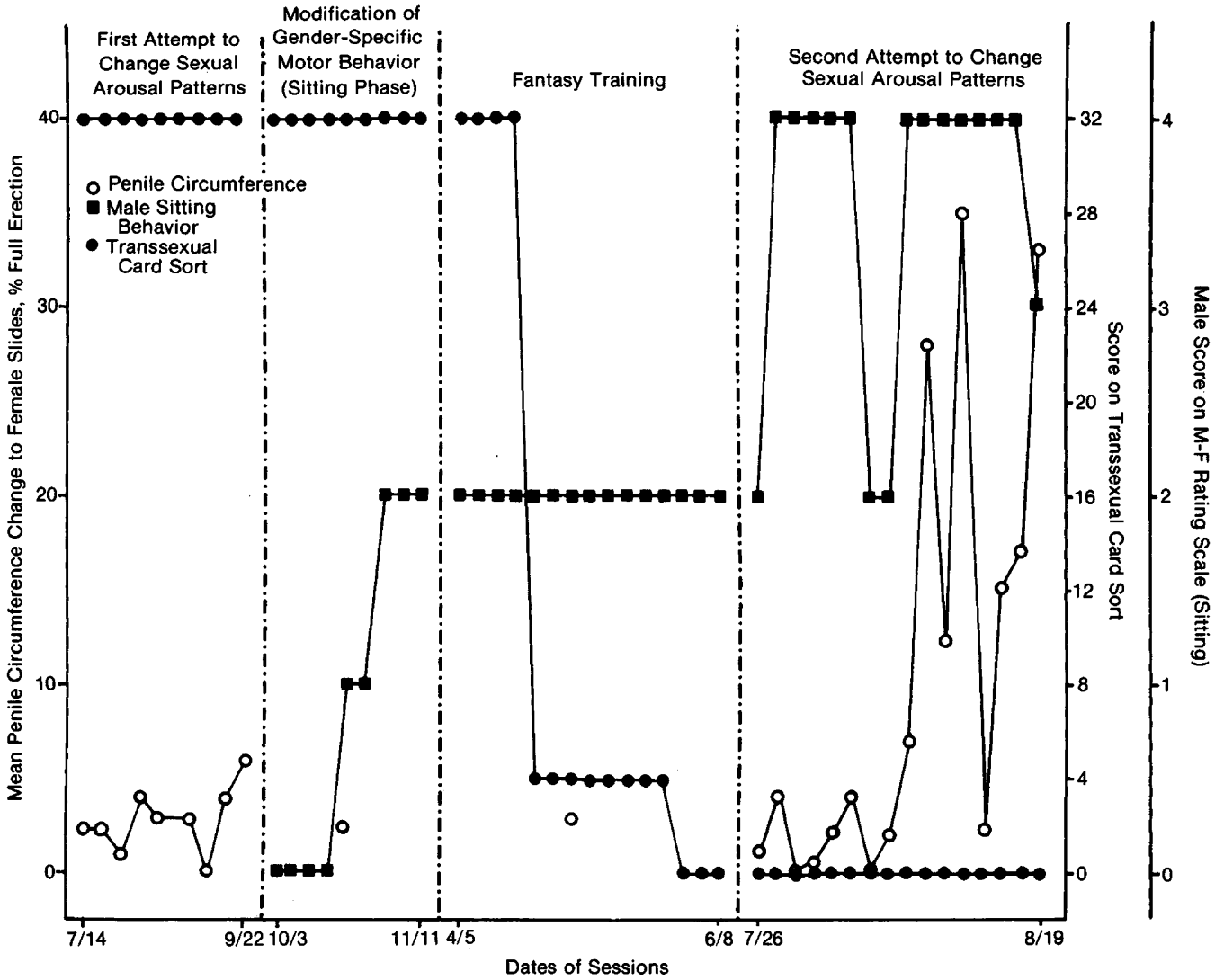


Fig 1.—Major behavioral changes in penile circumference change to women, transsexual card sort, and masculine motor behavior using sitting behavior as an example across all phases of treatment. Penile circumference changes to women are averaged for modification of gender-specific motor behavior phase and fantasy training phase.

dated history of spontaneous cross dressing before age 5; early development of feminine interests; reports of early cross-gender fantasies and identification; current extremely effeminate behavior; gender inappropriate vocational interests; reported cross-gender sexual fantasies; and requests for change of sex. Thus, every major component previously noted as contributing to a transsexual diagnosis was present.[2,4]

Since surgery was not possible at his age, he agreed to enter a treatment program designed to change his gender identity on the premise that it might at least make him more comfortable and that surgery was always possible at a later date.

## Measures

Three measures of different aspects of gender identity were administered throughout treatment and a fourth measure was initiated during the second phase of treatment.

1. Transsexual attitude scale: This measure, developed to assess the patient's gender identity, took the form of a card sort.[6] Ten statements made by the patient during initial interview were typed on 3 × 5 inch cards. The statements were:

I want to have female genitals.
I would like to be a girl.
I want to have long fingernails.
I would like to have a large bustline.
I would like to have long black hair.
I want to be a female prostitute.
I would like to be a waitress.
I want to be a secretary.
I would like to have a sex-change operation.
I want to have intercourse with a man.

Twice a week the patient sorted these cards into one of five envelopes marked from zero to four, based on the attractiveness or desirability of the state of affairs or activity indicated on each card. Zero represented no desirability and four represented much desirability. Thus, if the patient put all the cards in the number four envelope, his score would be 40, representing the extreme transsexual attitude.

2. Pattern of sexual arousal: Penile circumference changes to slides of nude men and women were recorded at least weekly and, during some phases, daily by means of a mechanical strain gauge.[7,8] During this measurement session the patient was shown three male and three female slides in random order for 60 seconds each. The interval between slides was 30 seconds of baseline recording or a return to baseline, whichever was longer. Response was scored as a percentage of full erection.

3. Sexual fantasies: The patient recorded daily in a small notebook each sexual urge occasioned by another person, or sexual fantasy in the absence of any person, and the sex of the person involved in the urge or fantasy.

4. A behavioral check list of gender-specific motor behaviors was developed during the second phase of treatment and is described below.

**Pretreatment Measures.**—Initial baseline measures of transsexual attitudes yielded a score of 32 out of a possible 40. The patient reported an average of seven homosexual urges and fantasies and no heterosexual urges or fantasies each day. Similarly, sexual arousal to male slides was high, averaging around 50% of a full erection, but virtually no arousal to women occurred.

**Attempt to Change Sexual Arousal Patterns.**—The first approach to this patient's problem followed our earlier work with homosexuals,[9] and Marks and Gelder's work with transsexuals,[10] in that a direct attempt was made to alter the deviant patterns of sexual arousal first by increasing heterosexual arousal and, second, by decreasing arousal to transsexual fantasies and to male stimuli. The first technique was "fading,"[11] in which heterosexual stimuli were gradually introduced during periods of sexual arousal. Although this technique has been experimentally shown to develop heterosexual interest in homosexuals, no progress was evident during eight treatment sessions and no changes in sexual arousal in the separate measurement sessions or sexual urges and fantasies were noted (Fig 1).

Since the patient had a dominant transsexual fantasy to which he frequently masturbated, it was felt that aversion therapy[12] might be successfully used to alter this fantasy as well as his homosexual attractions. In repeated sessions the patient was asked to imagine his transsexual fantasy and, when he indicated a clear image, an electric shock was delivered to his forearm until he signaled that the fantasy had ceased. In addition to the measures described above, latency to produce fantasies was recorded as an index of progress within treatment.[10] Despite over 48 daily half-hour sessions, no changes were noted in patterns of sexual arousal nor in reports of urges and fantasies. Even within treatment, latencies of deviant fantasies were not increased, indicating that this technique had no effect; this replicates the report noted above by Gelder and Marks.[5] The transsexual attitude scale remained at 32. This phase lasted approximately two months.

**Modification of Gender-Specific Motor Behavior.**—This failure led us to hypothesize that basic changes in sex role behavior were necessary. The most visible manifestation of mistaken gender identity in this case was the patient's effeminate motor behavior while sitting, standing, and walking. Since this behavior elicited social ridicule, causing the boy much discomfort, an attempt was made to modify these behaviors in the direction of masculinity.

To this end a behavioral check list of gender-specific motor behaviors was developed. Men and women were observed over a period of time in the natural environment and characteristic ways of sitting, walking, and standing were chosen on the basis of uniqueness to sex. Four male characteristics and four female characteristics of sitting, walking, and standing were chosen to form the scale. For example, one of the masculine behavioral components characteristic of sitting is crossing the legs with one ankle resting on the opposite knee. One of the female behaviors is legs crossed, closely together, with one knee on top of the other. Independent raters were trained and the scale was validated on groups of five men and five women chosen as normal for their sex. Interrater reliability was .96 and the scale clearly differentiated male and female motor behaviors.

Direct modification of sitting, standing, and walking was then attempted by modeling and video tape feedback. The effect of modeling and video tape feedback was experimentally analyzed in a multiple baseline design in which the modification of one category of behavior was first attempted while measures of all three categories were collected. After completion of work on the first category, modification of the second category was attempted, and so on.

In the experimental treatment phase, daily measures of masculine and feminine components of sitting, standing, and walking were taken as the patient came into the waiting room before his session by a rater who was not aware of changes in the treatment program. Also during this period a daily graded-exercise program was initiated and continued throughout the treatment; one thirty minute session was held daily. After five days of baseline procedures in which no treatment was given, modification of sitting behavior was begun. In each session the constellation of appropriate behavior was broken down and taught piece by piece. Each behavior was modeled by a male therapist and then attempted by the subject. Praise for success and verbal feedback of errors were administered. The last trial of the day was video taped and shown at the beginning of the next session. When the subject was sitting appropriately in the session and reported feeling comfortable, treatment was begun on walking.

## Results

The data are presented in Fig 2. During the no-treatment baseline period the patient showed a feminine manner of sitting with no masculine characteristics in the surreptitious setting. Walking was more variable, with male and female walking behaviors approximately equal; standing was mostly feminine. In the first phase of treatment in which sitting behavior was worked on, male sitting behaviors increased and female behaviors decreased in the separate surreptitious measurement situation. There was little stimultaneous change in male and female walking behaviors other than a slight drop in female components. A similar slight decline in female standing behavior was noticeable.

When treatment of walking behavior began, male walking behavior increased and female walking behavior decreased considerably. Female behavior continued to decline in sitting and standing. When standing behavior was treated, although changes occurred *within* the sessions, these did not generalize to the surreptitious situation as did other behaviors. In fact, female standing behavior lessened gradually across all phases with little change in male standing behavior.

These data indicate that the patient learned to behave in a more masculine manner while sitting, standing, and walking. Furthermore, there is evidence that the treatment (modeling, and video tape feedback) was responsible for these changes since male and female behaviors comprising sitting and walking did not change appreciably until treated. Once treated, however, improvement in the surreptitious setting continued. It seems in this case that changes in sitting and walking also generalized to standing, with the biggest change in standing occurring during the walking treatment. This is not too surprising, since walking and standing are closely related and share many of the same behavioral components.

Clinically the patient reported being more at ease and enjoying his male behavior since now people did not stare at or ridicule him so much. Shortly after completion of this phase he began attending a small high school part-time. However, no changes were noted in patterns of sexual arousal, reports of sexual urges and fantasies, or the

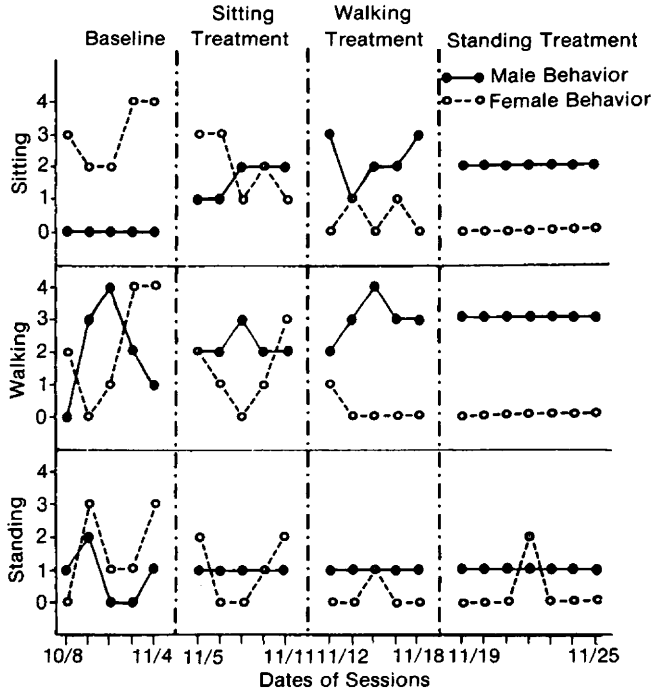


Fig 2.—Masculine and feminine behavioral components of sitting, walking, and standing during therapeutic attempts to increase masculine behavior in each of three categories.

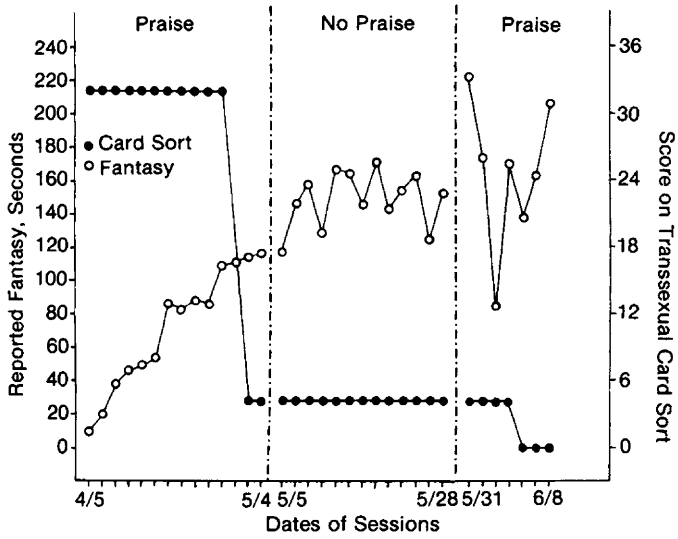


Fig 3.—Length of heterosexual fantasy during probes and total score on transsexual card sort during fantasy retraining.

transsexual attitude scale which remained at 32 (Fig 1).

This program was then extended to other behaviors included in the male role, again using modeling and practice. Since school was his major source of interpersonal contacts, several social situations in this setting were chosen for modeling and behavior rehearsal. For example, one scene involved talking to people sitting around his desk during class breaks about the preceding or following class or other academic topics. In a second, more difficult scene, the patient was seated with a group of boys discussing football, girl friends, or dates in a general bull-session atmosphere. A third scene involved asking a girl to go to the movies and the ensuing date.

Target behavior and goals in all scenes were increasing eye contact, increasing length of response to questions, more initiations of conversations, and demonstrating appropriate affect along with appropriate content of conversation. In the typical session the patient and the therapists, who were male and female research assistants in the department, would act out a situation followed immediately by a video tape playback of the scene.

During the video tape playback the therapist would discuss any mistakes or inappropriate behaviors emitted by the patient. Next, the therapists would enact the scene demonstrating the appropriate behavior and discuss it once again with the patient during video tape feedback. Finally, the first sequence in which the patient enacted the scene, followed by video tape feedback and discussion, was repeated. The scenes described above, and variations of them, were then rehearsed one at a time until both the patient and the therapists were satisfied with the progress. This phase consisted of 30 sessions and lasted two months.

The final behavior worked on in this phase was voice retraining directed at pitch (initially quite high) and inflections used during speech (judged to be very feminine). Another characteristic judged to be feminine in the patient's cultural setting was a certain clipped, precise manner of speaking. In this instance a more relaxed speech with some slurring was a therapeutic goal. In each session approximately ten sentences, with masculine content such as "I like being a boy," or "A good looking woman turns me on," etc, were read by a male model and then repeated by the patient. The sentences were audiotaped, played back to the patient, and detailed comments were made by the male therapist on voice characteristics.

Instructing the patient to keep his thyroid cartilage as low as possible was helpful in regulating pitch. The patient determined the relative position of his thyroid cartilage by a feedback technique in which he placed his finger on the cartilage during speech. This sequence was repeated one or more times and praise was given for improvement. Three weeks of daily sessions were devoted to voice retraining. Although no objective indices of voice and inflection were recorded, both the therapist and the patient reported significant changes. Shortly after completion of this phase the patient reported, with a degree of satisfaction, several occasions where close acquaintances had failed to recognize his voice over the phone.

An interview at the end of this phase of treatment revealed that the patient liked his newly learned masculine behavior. He reported that it was "now easier" to look and act like a boy and that he was getting better at it. However, he still felt like a girl, fantasized himself as a girl (both sexually and socially), and reported that if he had a choice at this time he would change his sex. Throughout this phase patterns of sexual arousal, as measured by penile circumference change, were homosexual with no arousal to women. Reports of sexual urges and fantasies remained exclusively homosexual and the transsexual card sort remained at 32 (Fig 2).

**Fantasy Training.**—With most overt behaviors markedly masculine, but mistaken gender identity as manifested by transsexual ideation still present, a direct attempt to modify transsexual thoughts and fantasies was initiated.

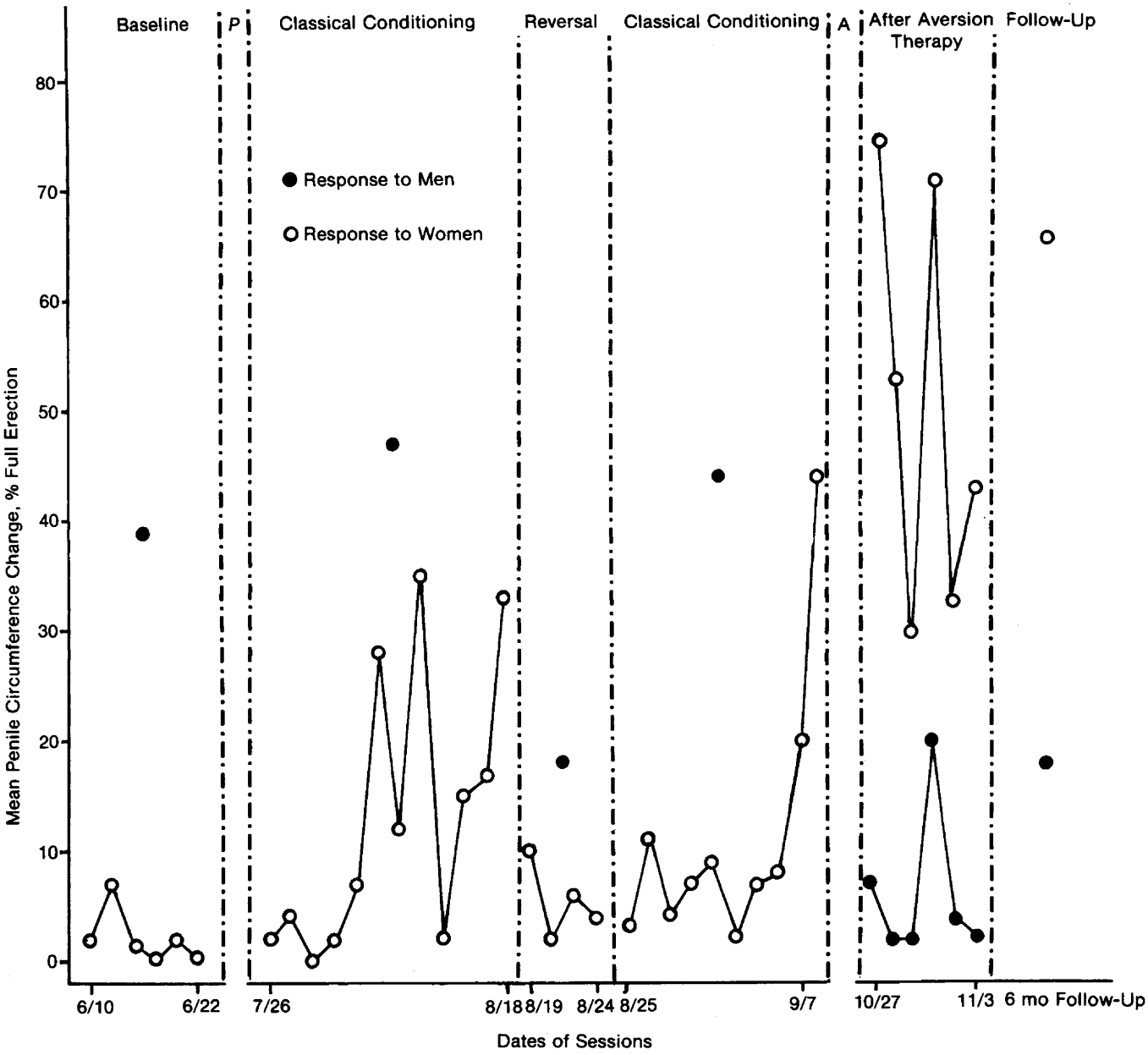


Fig 4.—Mean penile circumference change to female and male slides during classical conditioning to instigate heterosexual arousal and during six measurement sessions immediately after termination of aversion therapy. Male responses are averaged over each experimental phase during baseline, classical conditioning, reversal, and classical conditioning. Between baseline and classical conditioning, a period of procedural difficulties intervened (P). After second classical conditioning phase, aversion therapy was administered (A).

Although transsexual fantasies occurred in relation to many social and sexual circumstances, in the strongest and most frequent fantasy the patient imagined having a female body and engaging in intercourse with a man. An attempt was made to develop competing gender-appropriate fantasies in which the patient, as a man, had intercourse with a woman.

In this procedure the patient chose four pictures of a *Playboy* model which were least unattractive to him and was asked to fantasize sexual involvement with the woman pictured. When the image was clear he signaled by raising his index finger. If he was able to maintain the fantasy for a specified period of time, a second photograph or picture that the patient had previously chosen as very pleasant (in this case pictures of food and animals) was presented, indicating successful completion of a trial, and lavish praise was delivered. Initially, holding the image for ten seconds was sufficient to earn the praise; this criterion was increased approximately five seconds each day. Daily sessions consisted of four trials and all sessions were administered by a female therapist. Periodically during this phase the therapist would suggest pertinent behaviors with which to enrich the fantasy such as explicit details of foreplay.

At the end of each session a probe was taken in which the patient was instructed to imagine a heterosexual fantasy for as long as he was able; no additional instructions or suggestions were given. When he signaled a clear image by raising his forefinger, the therapist started a stop-

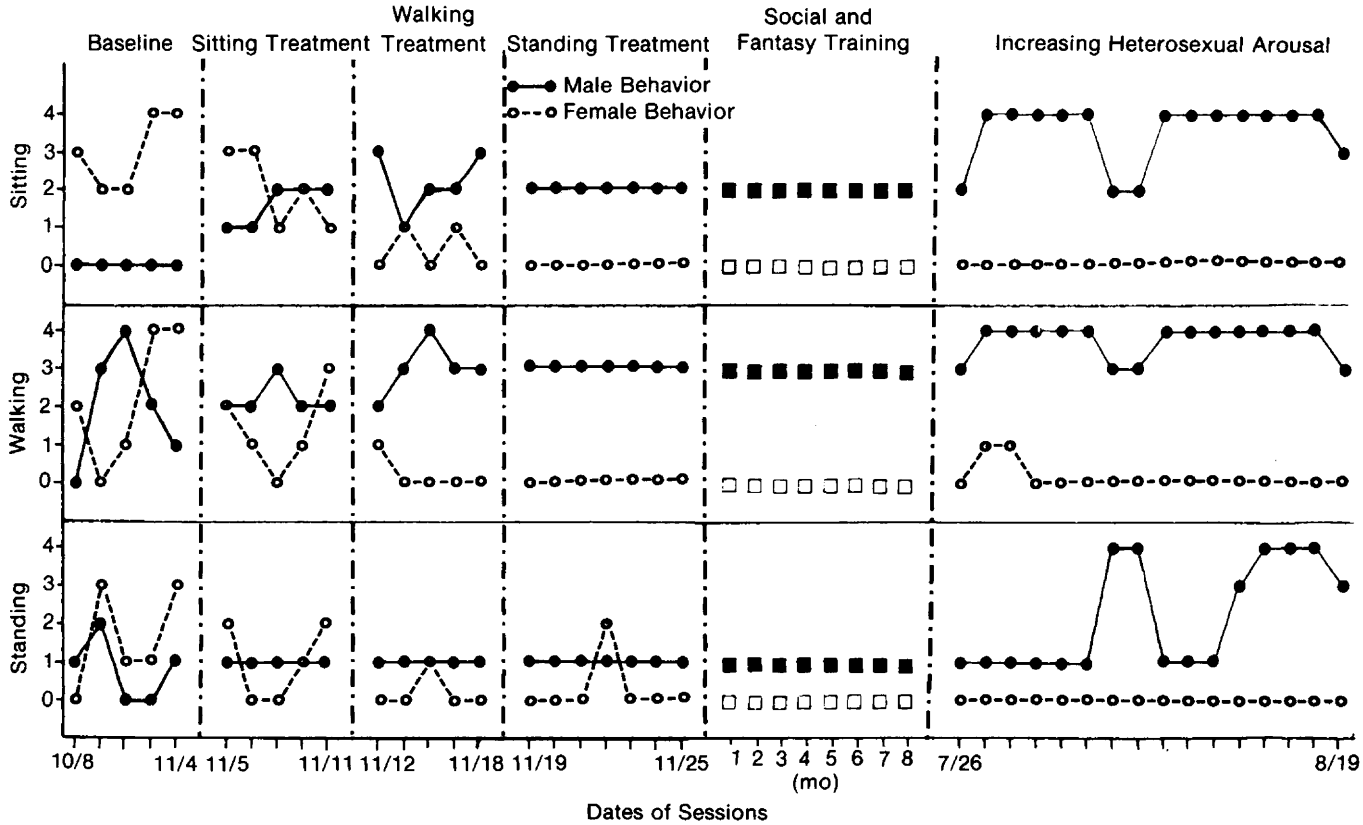


Fig 5.—Masculine and feminine behavioral components of sitting, walking, and standing during therapeutic attempts to increase masculine behavior in each of three categories and later during instigation of heterosexual arousal.

watch. When the image faded or the transsexual image impinged, the patient would signal by raising his head and the length of the fantasy was recorded.

To facilitate generalization the patient was instructed to bring his fantasy into his environment by attempting to fantasize sexual intercourse with young women he encountered in his daily activities and to formulate specifically those features in a girl attractive to him.

To determine the effective therapeutic variables in this procedure, social praise delivered by the female therapist for increasing length of gender-appropriate fantasy was withdrawn briefly during treatment and then reinstated.

These data (Fig 3) indicate increasingly longer fantasies during the probes when contingent praise was delivered in the treatment session; a leveling off at approximately 2½ minutes when praise was removed; and an immediate rise to over three minutes, followed by increased variability, when praise was reinstated. More important, transsexual attitudes as measured by the card sort technique also changed for the first time, dropping (becoming less transsexual) dramatically toward the end of the first reinforcement phase (from 32 to 4), then leveling off when praise was removed in the second phase, and dropping again when praise was reinstated. These findings, which parallel those of sexual fantasy, suggest that praise rather than practice alone or expectancy effects was responsible for the increasing ability to fantasize in a gender-appropriate manner.

Reports of sexual fantasies which the patient had been regularly recording throughout treatment also showed change for the first time. Reports of fantasies to women rose from zero to a level between five and nine per day, often surpassing the male fantasies which remained at five occurrences per day, indicating that he was able to transfer his newly developed fantasies outside the treatment sessions.

At the end of this phase, which consisted of 34 sessions and lasted about two months, the patient behaved like a man, felt like a man, and thought as a man does. However he was still sexually aroused by male stimuli (as measured by penile circumference changes) and reported continued sexual attraction to men in the environment, averaging about five per day, although none of these fantasies now involved gender role reversal. Despite reports of sexual fantasies to women, no sexual arousal to women (as measured by penile circumference change) was noted (Fig 1). In other words, he was now diagnostically a homosexual and techniques to change patterns of sexual arousal which had failed nearly a year previously were once again administered.

**Changing Sexual Arousal Patterns.**—As in the previous attempt to change patterns of sexual arousal, an initial effort was made to develop heterosexual arousal. To this end a classical conditioning procedure which had been experimentally analyzed previously as effective in increasing heterosexual arousal[13] was employed. In this procedure slides of nude women that elicited no arousal were used as conditioned stimuli and were followed by slides of nude men that elicited strong arousal (the unconditioned stimuli).

The first section of Fig 4 represents baseline procedures immediately before classical conditioning was begun. Female arousal was nonexistent while male arousal remained at approximately 40% of a full erection. After some initial procedural problems were resolved, sexual arousal to women was learned to the conditioned stimulus and generalized to other slides of women in the separate test session as measured by penile circumference changes.

In the second section of Fig 4 it is evident that arousal to female slides in the separate test session rose to an average of approximately 40% of a full erection during the first classical conditioning phase but male arousal also remained high. Subsequent withdrawal of classical conditioning was accompanied by a drop in heterosexual arousal followed by a further rise when the procedure was reinstated, suggesting that classical conditioning was responsible for the increase. Reports of sexual attraction or fantasies to girls in the environment increased at this time from an average of five occurrences to over 15.

Although the patient was now sexually attracted to women, strong homosexual attraction was still present. With homosexual arousal (as measured by penile circumference change) averaging approximately 45% of a full erection and reported sexual attraction and fantasies to men in the environment occurring at a rate of approximately eight per day, the final therapeutic strategy was to reduce this arousal. Aversion therapy using both electrical aversion and covert sensitization[6,14] was once again employed.

Unlike the first attempt, aversion therapy was now effective. During approximately 20 sessions of aversion administered over a period of two months, homosexual arousal was gradually reduced. The last part of Fig 4 represents six measurement sessions taken immediately following termination of aversion therapy. Sexual arousal to men averaged between 0% and 5%; reported fantasies dropped to approximately three per day. Female arousal, averaged over the six sessions, continued to increase and reached a level of 60%.

During the entire year surreptitious measures of male and female characteristics of sitting, walking, and standing, that were modified in an earlier phase of treatment continued to be recorded daily by an assistant who was not aware of the treatment phases. During the intervening eight months between the end of the motor retraining phase and the beginning of classical conditioning, no changes were noted in these behaviors. This lack of change is represented in Fig 5 under the section labeled social and fantasy training.

During instigation of heterosexual arousal by classical conditioning, however, maculine components of sitting, standing, and walking showed a sharp increase despite no therapeutic attempts to accomplish this goal at this time. These unexpected changes are shown in the last part of Fig 5.

An interview at this time with his parents revealed that his behavior was quite appropriate at home and no isolate or depressive tendencies were noted. He had begun full-time high school classes for the fall term, reported that he was comfortable and relaxed in most social situations, and would like to date and have sexual relations with women. In addition, he had gained over 6.8 kg during the year and had grown 3.8 cm. Figure 1 is the summary of important behavioral changes across all phases of treatment.

**Follow-Up.**—At this time formal treatment was terminated, although the patient was seen approximately once a week for a month in sessions that were largely supportive and often were devoted to advice on appropriate behavior in various social situations. In addition, some sessions were initially allocated to aversion therapy directed at remaining homosexual fantasies.

From this point on the patient was seen monthly for five months. Five months after termination the patient reported orgasm and ejaculation for the first time when imagining sexual intercourse with a girl while masturbating.

Six months after treatment heterosexual arousal averaged 65% of a full erection while homosexual arousal averaged 15%. Future appointments were made at three-month intervals.

At nine months the transsexual card sort was zero, indicating no gender identity confusion. Masculine behavior, recorded surreptitiously as he entered the office, remained high (at discharge levels); reports of homosexual arousal and fantasies had disappeared. The patient was doing well in school and had begun to date occasionally.

At one year the transsexual card sort remained at zero and masculine behavior continued stable at high levels. A measurement session of patterns of sexual arousal demonstrated heterosexual arousal at approximately 55% and homosexual arousal continuing low at 15%. Reports of heterosexual fantasies reached an all-time high. The patient had acquired a steady girl friend with whom he engaged in light petting and reported that he continued to become more confident and talkative.

## Comment

These data suggest that complex role behavior such as masculinity or femininity can be defined, broken down into its components, and changed piece by piece producing clinically important changes.

In this case gender-specific motor behavior, social behavior, vocal characteristics, sexual fantasies and attitudes, and patterns of sexual arousal were changed one by one resulting in a total sex role change. These classes of behavior seem to be relatively independent of one another. In only one instance did a change in one response class result in a change in a second response class. In this instance, increasing heterosexual arousal unexpectedly produced increases in masculine sex role behaviors, although increasing masculine sex role behaviors did not increase heterosexual arousal. Although the idea of relationships among responses is not new,[15] an experimental analysis of these relationships is only just beginning[16,17] and complex psychiatric disorders such as transsexualism offer fertile ground for such investigations.

A suggestion of the importance of fantasies in sex role behavior is also present in this case. Rejection of the female role did not occur until sex role fantasies were directly altered, despite the earlier changes in overt behavior from feminine to masculine. Although it is possible that transsexual attitudes would have changed eventually

as a result of the earlier behavioral changes, it had been four months since masculine motor behaviors were instigated and no sign of attitude change had occurred. These data also suggest that changes in sexual arousal patterns in transsexuals must be preceded by changes in sex role behavior, since positive conditioning of heterosexual arousal and elimination of homosexual arousal worked only after sex role behavior had been changed and not before.

This article does not propose these procedures as a "treatment" for transsexualism; it is possible that this case is not a prototypical transsexual. Although reliable historical data and presenting behavior characterize this patient as transsexual by current standards,[2,4] he was somewhat unusual in that he agreed to enter treatment—perhaps due to situational stress and the impossibility of sex reassignment surgery at his age. Many transsexuals, particularly older and more sophisticated patients, refuse any treatment perceived as a threat to their mistaken gender identity.

In the fuzzy area of diagnosis it may be that several types of transsexuals exist, each displaying mistaken gender identity and a reversal of sex role behavior but with different background variables, eg, differential exposures to prenatal biochemical influences.[18]

It is, of course, a logical fallacy to conclude that this patient was not transsexual *because* he changed, but more work is required to pinpoint causal variables of mistaken gender identity and their implications for treatment. What is needed, then, to qualify this approach as a treatment is systematic replication of these procedures on a large series of transsexuals.[19]

However, the fact that this patient changed is important since we may assume that luck, growth, or placebo effects do not produce change in transsexuals. Moreover, our techniques differ radically from those previously used and in many instances the procedures were experimentally demonstrated to be responsible for the change. In a sense what was done was to provide (in an intense way) opportunities for the patient to learn aspects of sex role behavior which are acquired during normal childhood development. The fact that this delayed opportunity was sufficient to change gender identity suggests that this complex set of behaviors may be more flexible than heretofore assumed. Thus, these results are theoretically significant and may stimulate further research which will lead to development of clinically effective treatments for transsexualism.

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